US Army Corps of Engineers

REPAIR, EVALUATION, MAINTENANCE, AND REHABILITATION RESEARCH PROGRAM

PROCEEDINGS OF REMR WORKSHOP ON MANAGEMENT OF BIRD PESTS

27 - 29 April 1988

Edited by
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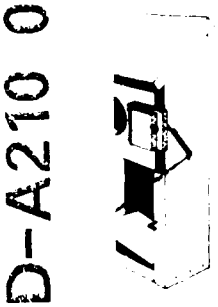

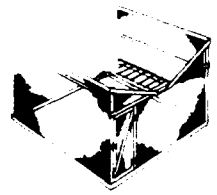

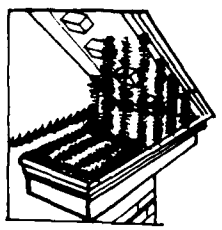

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COVER FIGURES:

FIRST – Plastic bird netting
SECOND – Nest box trap for starlings or house sparrows
THIRD – Australian crow trap
FOURTH – Porcupine wire

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Presented are abstracts for presentations given at the Workshop on Management of Bird Pests. The Workshop was conducted to introduce Civil Works personnel to the state-of-the-art technology for controlling/managing bird damage and nuisance birds, consistent with environmental protection, and to provide guidelines for obtaining technical and operational assistance from government agencies responsible for bird damage control.

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PREFACE

The abstracts of the Repair, Evaluation, Maintenance, and Rehabilitation (REMR) Research Program Workshop, "Management of Bird Pests," were prepared for the Office, Chief of Engineers (OCE), US Army by the US Army Construction Engineering Research Laboratory (USACERL).

The workshop was organized by USACERL using funds provided by the US Army Waterways Experiment Station (WES). Mr. William F. McCleese is the REMR Program Manager. Dr. David Otis and Dr. Donald Mott, Denver Wildlife Research Center, US Department of Agriculture were instrumental in developing the program and suggesting qualified speakers. Mrs. Deborah Curtin did an excellent job of coordinating all the necessary and complex aspects of Workshop planning, publicity, and registration. Ms. Jill Sexton put the abstracts on computer.

The Workshop was funded by the REMR Research Program under Work Unit 32333, "Control of Roosting Birds and Bird Waste." Mr. James E. Crews (CECW-O-M) is the REMR Technical Monitor for this work.

COL Carl O. Magnell was Commander and Director of USACERL and Dr. L. R. Shaffer was Technical Director.

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PRESENTATIONS

PROCEEDINGS OF REMR WORKSHOP ON MANAGEMENT OF BIRD PESTS

INTRODUCTION

The Repair, Evaluation, Maintenance, and Rehabilitation (REMR) Workshop on Management of Bird Pests was held at the Holiday Inn French Quarter, New Orleans, Louisiana, on 27-29 April 1988. The Workshop was sponsored by a research work unit under the REMR program entitled, "Control of Roosting Birds and Bird Waste," for which Dr. Anthony J. Krzysik, Workshop Director, is Principal Investigator.

The objectives of this Workshop were to introduce Civil Works personnel to the state-of-the-art technology for controlling/managing bird damage and nuisance birds, consistent with the environmental protection, and to provide guidelines for obtaining technical and operational assistance from government agencies responsible for bird damage control.

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BIRD PROBLEMS AT CIVIL WORK PROJECTS

Anthony J. Krzysik

ABSTRACT

1. A questionnaire was designed and distributed nationwide to US Army Corps of Engineers Civil Works Projects to evaluate the nature and magnitude of bird damage and nuisance bird pests. Two hundred sixty-seven individual projects or management offices responded to the questionnaire. Fifty-eight of these projects/offices reported that they had no significant problems with birds. The 209 projects/offices with bird pests identified a combined total of 783 individual pest problems or bird damage, an average of almost four problems per project. Four bird problems, in their ranked order: potential health hazards, aesthetics, deterioration of paints/coatings, and interference with maintenance procedures, accounted for 51 percent of reported problems. Four additional problems: safety considerations, damage to structural materials, mechanical equipment, and electrical equipment, cumulatively accounted for 83 percent of all reported bird problems.

2. Since more than one bird species could be associated with a specific pest problem, the 783 pest problems constituted 1472 problem/bird species occurrences, almost two bird species per problem. Three species introduced from Europe: (see Table 1) pigeon, starling, and house sparrow, in ranked order, contributed to 57 percent of problem/species occurrences. Three groups of native species along with the three exotics accounted for 88 percent of problem/species occurrences. Blackbirds (red-winged blackbird, common grackle, brown-headed cowbird), gulls (mainly ring-billed, California, and herring), and swallows (specifically cliff and barn) have dramatically increased their populations and geographic ranges directly as a result of anthropic practices and landscape changes.

3. The most severe and widespread bird damage occurred when pigeons roosted or nested on structures such as lock and dam complexes, bridges, and power generating stations. Gulls, swallows, and a few other species were

responsible for similar localized problems, usually on a smaller scale. The chief complaint was bird excrement.

4. Another source of bird damage occurred when starlings, pigeons, and/or house sparrows nested or roosted within buildings. Again, excrement was the primary concern, but avian ectoparasites and damage to building insulation, electrical circuits, and equipment were also important considerations. Starlings and house sparrows also nested in crevices associated with Civil Works structures. Their excrement and nests contributed to deterioration and failure in mechanical, hydraulic, and electrical components.

5. Canada geese at some Civil Works facilities were a problem on lawns and public-use areas because they contaminated and damaged the turf, sometimes causing severe destruction. They also contributed to potential health hazards, and aquatic eutrophication. Minor problems reported were agricultural depredations (mainly from blackbirds), competition with native bird species (mainly from starlings), scavenging, and predation. Table 2 summarizes these findings. A US Army Corps of Engineers Technical Report is available that presents in more detail the bird pest problems at Civil Works Projects.[1]

6. On the basis of a detailed analysis of questionnaire responses, 29 projects, representing 16 nationwide Corps of Engineers Districts, were identified as having the severest, as well as most representative, Civil Works bird problems. These Districts and projects were contacted by telephone to further assess their individual problems. Bird damage control authorities were consulted to establish additional contacts with the projects. The consensus of these experts was that most Civil Works bird problems could be controlled with existing established pest management techniques.

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[1]Krzysik, A. J. 1987. "Evaluation of Bird Pest Problems at US Army Corps of Engineers Civil Works Projects," Technical Report REMR-EM-2, US Army Construction Engineering Research Laboratory, Champaign, Illinois.

7. Based on the research, it was recommended that a workshop be organized to introduce Civil Works personnel to bird management technologies, and to make them aware of the availability of State and Federal contacts for bird damage control and guidance. It was also recommended that funding be generated for additional research to develop technologies for deterring Canada geese from recreational and other public-use areas.

TABLE 1

BIRD PESTS INTRODUCED FROM EUROPE

SPECIES	YEAR INTRODUCED	SITE
Common Pigeon (Rock Dove)	1606	Port Royal, Nova Scotia
	1621-1622	Virginia
	1642	Massachusetts
House Sparrow (English Sparrow)	1853	Brooklyn, New York
European Starling	1890	Central Park, New York

TABLE 2

SUMMARY OF CIVIL WORKS BIRD PROBLEMS

PROBLEM SITE	SPECIES	CAUSE	SEVERITY	OCCURRENCE
Dam or Lock or Power House	Pigeons	Excrement	Serious	Widespread
	Gulls	Excrement	Minor-Serious	Local
	Starling roosts	Excrement	Very Serious	Local
	Starlings	Nests and Excrement	Minor-Moderate	Widespread
	Sparrows	Nests and Excrement	Minor	Widespread
	Swallows	Nests and Excrement	Minor-Serious	Local
Bridges	Pigeons	Excrement	Serious	Local
			Minor-Moderate	Widespread
Buildings	Starlings	Nests and Excrement	Serious	Local
	Sparrows	Nests and Excrement	Moderate	Local
Public-Use Areas	Canada Geese	Excrement	Minor-Serious*	Local
		Aggressive Behavior		
	Gulls	Excrement	Potential Problem	Local
		Aggressive Behavior		
	Swallows	Excrement	Potential Problem	Local
		Aggressive Behavior		
	Pigeons	Excrement	Potential Problem	Local

*High Potential for serious future problems.

HEALTH AND NUISANCE PROBLEMS CAUSED BY PIGEONS, STARLINGS, AND SPARROWS

Jeffery W. Jones

ABSTRACT

1. The common pigeon (Columba livia), European starling (Sturnus vulgaris), and house sparrow (Passer domesticus) were all introduced from Europe. Since their introduction, these species have dramatically increased their populations and ranges throughout the United States, and have successfully exploited the urban environment. The proximity between humans and these birds has created a variety of conflicts.

2. Pigeons, starlings, and sparrows are associated with bacterial, fungal, protozoal, and viral diseases that can affect humans. These diseases can be transmitted to humans in a variety of ways (e.g., fecal material, airborne spores, and arthropod vectors). Effects of avian-transmitted diseases vary in their severity from mild illness to death.

3. Avian ectoparasites include a variety of insects, mites, and ticks. Some of these arthropods cause illness, but most are generally a nuisance. Some insects associated with birds can damage building materials (i.e., webbing clothes moth).

4. Avian nuisance problems can be categorized as aesthetic problems, property destruction, and health/safety. Aesthetic problems include: sight, smell, and noises which can be displeasing to individuals near areas of high bird concentrations. Property destruction implicates the birds ability to cause accelerated deterioration of a wide variety of materials due to their acidic droppings, feathers, nests, and carcasses. Safety problems with birds include bird-aircraft strikes and injury to employees working in areas of high bird concentration.

5. Health and nuisance problems should always be considered when dealing with these three avian species. Care should be taken when individuals are involved in the cleanup of areas with bird problems. Personnel should use protective equipment including respiratory apparatus, coveralls, rubber boots, and cap. Following cleanup operations, protective equipment should be disinfected (or discarded) and personnel should wash thoroughly.

BLACKBIRD-STARLING ROOSTING PROBLEMS AND THEIR CONTROL

Donald F. Mott

ABSTRACT

1. Blackbirds and starlings (Sturnus vulgaris) often establish nighttime roosts in areas where their presence may be objectionable because of health, agricultural, and nuisance problems. During the winter months more than 300 million of these birds congregate in hundreds of roosts in the southeastern United States. Roosts containing over 1 million birds are not uncommon. Roosting populations are primarily composed of red-winged blackbirds (Agelaius phoeniceus), common grackles (Quiscalus quiscula), brown-headed cowbirds (Molothrus ater), and starlings. These birds damage sprouting and ripening crops and consume livestock feed in feedlots. Histoplasmosis, a human respiratory disease caused by the fungus Histoplasma capsulatum, is often associated with the accumulated bird droppings in these roosts. Roosts located near airports are always of concern because of potential aircraft-bird strike hazards. In addition to health and agricultural problems, birds in urban roosts often create nuisance situations involving odor and property damage.

2. Methods used to address roost related problems include both nonlethal and lethal means. Techniques to relocate roosting birds to areas where they are less of a problem include using a variety of frightening devices and modifying the roosting habitat. PA-14, a lethal wetting agent, has been shown effective in reducing roosting bird populations under certain environmental conditions. This chemical is sprayed on the birds by aircraft or ground-based spray systems. Recent improvements in ground-based application procedures have greatly enhanced the use of this control method. Using toxic baits at feedlots and other bird assemblage areas has also been employed with some success, and improved baiting procedures are presently being investigated.

BIRD CONTROL METHODOLOGIES

Edward C. Cleary

ABSTRACT

1. Four general areas of human-bird conflict that require control programs are: 1) direct damage to property, 2) aesthetic or nuisance damage, 3) endangering public health and safety, and 4) bird conflicts with wildlife. The objective of any bird control program must be to alleviate the human-bird conflict, concurrent with maintaining diverse wildlife populations, and minimizing environmental impacts on degradation.

2. A number of questions must be answered before any control program is attempted:

- What is the problem?
- What species of birds are involved?
- What is the legal status of the problem bird(s) at the Federal, State, and local levels?

  Federal: 50 CFR Section 10.13 defines migratory birds, sections 21.43, 21.44, 21.45, and 21.46 allow the taking of specific birds under specific circumstances without a Federal permit.

  State: No two states have similar bird laws.
- What are the most effective and legal control methods available?
- How selective will the method of control be?
- What is the behavior pattern of the birds as they move between their feeding, loafing, and roosting areas?
- How much will it cost to apply the selected control method(s)?
- What are the local public feelings about the birds, their damage, and their control?

3. Three basic control techniques are applicable to bird management: Habitat Modification, Protection, and Population Reduction.

a. Habitat modification involves altering the environment to make it less desirable to the problem species. This normally requires reducing or eliminating the bird's feeding, nesting, roosting, or loafing sites.

b. Protection means making the area inaccessible or unattractive to the pest birds. This can be done mechanically, chemically, or through the use of acoustical and/or visual scaring devices.

(1) Mechanical bird-proofing involves using physical barriers to deny birds access to a particular area: Screening, netting, porcupine wire, overhead wire grids.

(2) Chemicals affecting touch or taste can be used to repel birds. Tactile repellents such as polybutene or polyisobutylene (Roost-No-More®,etc.) can be applied to bird roosting areas such as rafters in storage sheds and barns, and building ledges. 4-Aminopyridine (Avitrol®) is registered as a lethal repellent for the control of pigeons; house sparrows; red-winged, yellow-headed, Brewers', and rusty blackbirds; grackles; cowbirds; European starlings; crows; and gulls on or in structures, feeding, nesting, loafing, and roosting sites.

(3) Sound or noise generating devices that can be used to drive birds from specific areas include: prerecorded alarm/distress calls, Av-Alarm® systems, pyrotechnics, shellcrackers or bird bombs, and propane cannons. All have been used with varying degrees of success. Ultrasonic sound generating devices have not been effective bird repellents.

(4) Visual repellents are simply a variation on an ancient theme - the scarecrow. Hawk, falcon, or owl (raptor) silhouettes, balloons, and flags have all been tried with some degree of success. Much of the success that has been achieved with these devices may be attributed to "new object reaction" rather then any actual frightening effect produced by them. Mylar tape is a new product that has been successful in protecting lawns, crops, and other areas from bird damage. Bird acclimation to acoustical or visual scaring devices is a persistent problem.

c. Population Reduction involves killing the target species. The annual natural mortality must be exceeded or no overall reduction of the pest population will be achieved. The most commonly used population reduction methods are: Shooting, trapping, and poisoning.

(1) Shooting. Three rules must be adhered to when using shooting as a population reduction tool: 1. Check the state and local ordinances. 2. Use the proper gun. 3. Use personnel who are adequately trained in the safe handling and use of firearms.

(2) Trapping. Problem birds can be trapped using live traps, rocket or cannon nets, and rat or mouse snap traps. Live-trapping has successfully been used to control small groups of flocking birds such as European starlings, blackbirds, English sparrows, and pigeons. Cannon or rocket nets are useful in capturing nuisance waterfowl, pigeons and gulls in situations where other methods are not practical. Snap traps are used for individual problem birds such as woodpeckers that are attacking wood-sided buildings. The disposition of trapped birds will depend on the legal, political, and social realities of each situation. It is generally recommended that unprotected birds be destroyed following local SPCA recommendations. Migratory or game birds are generally relocated.

(3) Toxicants. Four toxicants - strychnine, 3-chloro-p-toluidine hydrochloride, Endrin, and Fenthion - are currently registered with the US Environmental Protection Agency (EPA) for use in bird control. Any time a toxicant is used, every effort must be made to retrieve and properly dispose of dead birds. At the end of the control program, every effort must be made to pick up and dispose of unused bait material.

(a) Strychnine alkaloid at a 0.6 percent concentration is registered for use against English sparrows and feral pigeons in nonagricultural and urban areas. Strychnine is biodegradable and does not persist in the environment. The flesh of an animal killed with strychnine is not toxic to other animals. To be effective, strychnine must be taken orally. It

cannot be absorbed through unbroken skin. Strychnine is not a chronic or cumulative poison. Strychnine kills by over-stimulation of the central nervous system. The amount of strychnine necessary to kill an animal is a function of body weight, general physical condition, length of time since last meal, and overall metabolic rate. There is a vast difference in the amount of any toxicant necessary to kill different species of animals. For example, the amount of strychnine necessary to kill a 13 ounce pigeon is approximately the same as the amount necessary to kill a 25 pound dog. Large whole kernel corn is normally used for pigeon bait. The best bait materials for English sparrows are wheat, barley, oats, or cracked corn.

(b) 3-chloro-p-toluidine hydrocholoride, under the brand names Starlicide® and DRC-1339, is registered with the USEPA for use against a number of pest birds. This chemical induces a generalized circulatory impairment in the liver, kidney, and to a lesser extent the brain, leading to massive uremic poisoning. Death occurs in 3 to 50 hours following ingestion of a lethal dose. The length of time between ingestion and death is a function of the amount of material eaten. European starlings, red-winged blackbirds, and crows are very susceptible to this chemical. The LD-50 for these birds is between 1.8 and 3.2 mg/kg. The LD-50 for pigeons is about 17.7 mg/kg. English sparrows are very resistant to it; the LD-50 is around 400 mg/kg. Mammals are generally resistant to the material. Starlicide is registered for use against European starlings and blackbirds around livestock feedlots and poultry operations. DRC-1339 Gull Toxicant, is registered for the control of herring gulls and great black-backed gulls within the coastal area of the northeastern United States in breeding colonies of terns, puffins, laughing gulls, or other colonial nesting seabirds. There are a number of Special Local Need (SLN 24-C) registrations for DRC-1339 which allow its use against blackbirds, crows, and European starlings in roost staging areas and against pigeons in urban areas.

(c) Endrin and Fenthion are insecticides that are registered for use in the Rid-A-Bird® toxic perch to control European starlings, pigeons, and English sparrows in the following locations: bridges, pipe yards, loading docks, building tops, inside buildings, and in and around farm buildings. The

use of Rid-A-Bird perches outside of buildings is generally not recommended because of the danger to nontarget bird species, predators and scavengers. An effort must be made to pick up and properly dispose of dead birds. Dogs, cats, raptors, and other wildlife are susceptible to secondary poisoning from Endrin or Fenthion. When used in buildings, the perches should be strategically placed in favored perching areas. When birds land on the perch, they absorb the toxicant through their feet. Special care must be taken when filling the perch to prevent spillage and contamination of tools, work surfaces, or other areas that might be contacted by people, pets, or nontarget wildlife.

(d) ORNITROL is a chemo-sterilant registered with the USEPA for the control of pigeons. This chemical inhibits embryo formation within the egg and temporary sterility results without harming the bird. The only effect this chemical has on an existing pigeon population is to inhibit reproduction. Its value as a population reducing agent is questionable, but it may be of some value in slowing population rebound following reduction by other means.

(e) PA-14 (Tergitol®) is a wetting agent or surfactant registered for control of roosting red-winged blackbirds, rusty blackbirds, common grackles, brown-headed cowbirds, and European starlings. It is applied to a bird roost using either fixed or rotary wing aircraft, a specially developed sprinkler irrigation system, or a specially modified water cannon. PA-14 works by washing the natural oils out of the birds feathers, causing them to clump and lose their insulating ability. This in turn leads to hypothermia in the birds and they die of exposure. To be effective, birds treated with PA-14 must be exposed to sub-40 °F temperatures and at least one-half in. of rain within 12-24 hours after application.

(4) Population reduction can be the most expensive and least permanent control tool available. In addition, it has the poorest public relations image of all control methodologies. If population reduction programs are not coupled with conscientiously applied programs of habitat modification and protection, the birds will return and the conflict will continue.

BIRD SCARING TECHNIQUES

Michael D. Hoy

ABSTRACT

1. Birds and their activities often conflict with human interests. In such cases it may be necessary to disperse the birds in order to resolve the conflict. Although habitat modifications that exclude or make an area unattractive are generally the best long term solutions, it is often more practical and economical to remove the birds with scaring devices. A wide variety of methods have been used, including propane exploders, pyrotechnics, alarm/distress calls and other recorded acoustics, predator models, scarecrows, flashing lights, plastic tape, balloons, radio controlled airplanes, and 4-aminopyridine.

2. Often birds habituate to any one scaring device. A greater degree of success is achieved if a combination of techniques is used. Scaring devices are particulary effective when spatial and temporal randomness are incorporated in their deployment. Diversity and unpredictability are important factors in any bird scaring program.

3. Timing is an important factor when attempting to disperse birds from an area. Scaring techniques are more effective if the birds have recently inhabited the area. Therefore, prompt action is essential in dealing with bird problems, and will greatly enhance the effectiveness of the program. Birds are restless during migratory periods and are more responsive to scaring devices at this time. Experience has shown that nesting birds are difficult to disperse.

4. Initially, birds may appear unresponsive to scaring devices. This typically occurs when birds have inhabited an area for some time. Although this may be discouraging, it is important to maintain the scaring program. The birds will eventually become annoyed and disperse to more peaceful settings. Persistence will be rewarded with a successful bird scaring operation.

5. When using bird scaring devices, it is easy to overlook biological control methods that could enhance the dispersal of birds. Birds follow daily routines and the key to bird scaring centers on breaking these daily habits. Careful observation of the birds will reveal important biological features (i.e., staging areas, feeding grounds, loafing sites) that can be included in the overall bird scaring campaign. If one stage in the bird's daily routine can be broken or removed, the job of scaring the birds and dispersing them to other areas becomes easier.

PIGEON CONTROL AT INDUSTRIAL SITES

Dwight LeBlanc

ABSTRACT

1. Pigeons, starlings, and house sparrows are the most visible bird pests in urban and industrial areas. Several methods are available for the management of these species; however, each must be tailored to site-specific circumstances.

2. The purpose of this talk is to give workshop participants information relative to the control of pigeons at industrial sites. A case history of pigeon control at the Big Cajun Number 2 Power Plant, Pointe Coupee Parish, Louisiana, is discussed from perception of the problem to reduction of the resident population with strychnine.

3. Pigeon numbers had increased dramatically at the facility in April 1987. Plant officials were concerned that pigeons were a nuisance and were affecting worker morale, equipment was being damaged, and workers contacting droppings were exposed to health and safety risks.

4. Exclusion, shooting, trapping, use of frightening devices, nest destruction, and chemosterilants were all considered and rejected as control alternatives because they were impractical, uneconomical, or ineffective for this specific problem. A decision was made by plant officials to use strychnine, despite the negative publicity and hazards to nontarget species associated with toxic bait programs.

5. Strychnine is widely used and is registered for controlling specified rodents and depredating birds. It is fast-acting and can significantly reduce a large population of birds within a few hours. Other advantages include: cost, ease of application, and with careful supervision by a certified pesticide applicator, it poses minimal hazards to nontarget species.

6. Strychnine treated whole corn with a two week prebaiting period was used on three occasions to kill pigeons: May and June 1987, and February 1988. Before using treated bait, State and Federal wildlife agencies were contacted to inform them of the method for controlling pigeons and the potential to affect nontarget bird species. Necessary incidental kill permits were obtained. Plant workers and a tenant farmer were also advised of our schedule.

7. Strychnine-treated bait was placed on the specific prebait sites for 8 hours. These sites were monitored during the day and pigeon carcasses removed. At the end of each treatment day, all the uneaten treated grain was buried with the dead birds.

8. One hundred seventy pigeons were killed during this three-part poisoning program. This number represented 85 percent of the pigeons that were seen during the prebaiting period. Additionally, 30 nontarget birds were killed.

9. The success of any control program depends on maintaining the target pest at acceptable population levels. Although we recommended trapping and shooting to maintain the pigeon population at a low level, no attempt was made to implement this recommendation. Consequently, pigeon numbers increased between June 1987 and February 1988. Therefore, strychnine was again needed in early 1988.

10. Strychnine is suggested as a valuable and effective tool when used properly. Several comments are offered if a pigeon control program is being considered.

a. Assess the problem carefully and consider all possible control methods. Strychnine is not a permanent control measure nor is it 100 percent effective.

b. A formulation that is registered for the state where the control will be implemented should be used. All safety precautions must be followed. The

use of strychnine must be under the direct supervision of a certified pesticide applicator.

c. Make sure that nontarget hazards are minimized. An incidental kill permit must be obtained if kills of regulated nontarget birds are expected. Federal, State, and, perhaps, local permits may be needed.

d. Keep in close contact with all interested parties, from supervisory and management personnel to local environmental groups.

e. Assistance from the US Department of Agriculture/Animal Damage Control (ADC) program in your state is highly recommended. ADC biologists are experts in the field of animal damage control and can provide valuable information concerning specific target pests. Under existing authorities, ADC can provide either technical or operational assistance.

CANADA GEESE: NUISANCE AND HEALTH PROBLEMS AND THEIR CONTROL

Donald F. Mott

ABSTRACT

1. Local resident populations of Canada geese are increasing, causing many nuisance and health problems. Complaints come from urban and suburban areas where the geese forage on grass lawns in parks, golf courses, beaches, campgrounds, and homeowners' backyards. They also contaminate utility water supplies, ponds, and lakes with their feces and are a source of complaints at US Army Corps of Engineers water impoundments. Reasons for the increase of suburban geese vary, but certainly admiration for the bird stimulated its establishment. An abundance of food, habitats, and low predation (including hunting pressures), ensure flourishing populations.

2. A variety of methods have been tried to cope with problems caused by geese. Exclusion devices including perimeter fencing, electric fencing, and overhead wires have found limited utility. A variety of visual stimuli have been tried including human type scarecrows, colored flags, and metallic reflective tape. In general, visual stimuli are more effective when used in combination with auditory devices such as pyrotechnics, shooting, or propane cannons. Since hunting is usually not allowed in urban-suburban areas, attempts at population reduction have been made by trapping geese during their flightless molting period (late June and early July) and relocating them elsewhere. Goose relocations may only provide short-term relief since other geese move into the area.

3. Recent research studies to remove geese from nuisance areas have investigated the effectiveness of chemical repellents, pyrotechnics, and recorded alarm/distress calls. The two repellents, one a grape flavoring and the other a carbamate insecticide, have effectively reduced goose feeding on grass in research trials. More extensive research with these chemicals is anticipated. A recent study at a Corps facility in Tennessee showed that playing recorded goose alarm/distress calls effectively reduced goose usage in the areas

tested, but greater success was achieved when racket bombs were used in conjunction with alarm/distress calls.

RESIDENT GOOSE CONTROL ON PERCY PRIEST RESERVOIR

Edward Penrod

ABSTRACT

1. Recreational use of J. Percy Priest Reservoir represented 8 million user trips in 1986 and included picnicking, swimming, fishing, boating, skiing, and hunting. Multiple use and a local high human population density combined with a rapidly expanding resident goose population, have created serious problems for natural resource managers. Operators and users have expressed dissatisfaction with the volume of goose feces deposited on picnic, camping, and beach areas. Concerns are loss of aesthetics, potential health hazards, and maintenance problems. A large goose population, with expanded air traffic, increases the potential for a bird-aircraft strike at nearby Nashville Municipal Airport. Crop damage has resulted in three illegal poisonings of geese in Tennessee. Additionally, some people view the domestication of the Canada goose with scorn, since they consider the species representative of our wildlife heritage.

2. In an effort to reduce the problems caused by Canada geese on Percy Priest Reservoir, a multiagency plan was implemented in early 1987 to harass geese at five recreational public use areas where problems were particularly severe. During the first week of March, 500 to 700 geese were resident in these areas. A variety of pyrotechnics were used: a 15mm pistol launcher, blanks, rocket bombs, and bangers. The geese were located and harassed until they left the site. Occasionally birds were chased for 7 miles. Originally, the birds were harassed 5 to 7 days a week, 7 a.m. until late afternoon. During the first month of harassment, it required three people to achieve adequate control. The need for this effort continued to decline. On May 15, the five areas were under control with a minimum of effort and by June 30, all areas were under control. By the middle of August, geese were not observed at this portion of the reservoir. Initially, alarm/distress tapes using a chorus of disturbed geese combined with pyrotechnics was used. However, later in the program, the

birds reacted well to only alarm/distress calls. Mott and Timbrook (1987)[1] found similar results in 1986 at nearby Cordell Hull Reservoir.

3. In addition to acoustical harassment, 235 goose eggs were removed. Additionally, two stations baited with 12,000 pounds of corn were established in April through June in an effort to attract geese to a less sensitive area. Sixty to 110 geese frequently used these bait stations.

4. On July 22 and 30, all molting geese and goslings (177) that could be located were removed and relocated to areas where hunting is permitted. The annual goose harvest was increased by reducing the size of the nonhunting zones and increasing the length of the hunting season and harvest quota. Additionally, mud flats were sowed with ryegrass, and permanent pastures were established to attract geese to areas open for hunting. The ryegrass provided fall and winter grazing for the geese until the mud flats became inundated with spring floods.

[1]Mott, D. F., and Timbrook, S. K. 1987. "Alleviating Nuisance Canada Goose Problems with Acoustical Stimuli." Report for USA-CERL, Denver Wildlife Research Center, Bird Damage Research Report No. 380, US Department of Agriculture.

CONTROLLING GULL DAMAGE ON CIVIL WORKS STRUCTURES

James E. Forbes

ABSTRACT

1. North America gulls are expanding their ranges and increasing their population sizes. Three species of gulls are common in the Northeast. Listed in declining order of population sizes they are the herring gull, ring-billed gull, and great black-backed gull. The laughing gull occurs in scattered locations along the New England coast, but reaches higher densities from New Jersey southward along the Atlantic coast. The laughing gull is very abundant in coastal Florida. Herring gulls, formerly limited to nesting in New England, now breed as far south as North Carolina and wander along the Gulf Coast to New Orleans. Ring-billed gull populations are exploding in the Great Lakes region, with one colony growing from 10 pair to 80,000 pair in a 10-year period. Presently, gull populations appear to be stabilizing along the Atlantic seaboard while increasing in the Great Lakes region.

2. Much of this range expansion and population explosion may be attributed to an unlimited food supply at landfill dumps. Gull populations are adapting to new food items such as cherry, blueberry, sudan grass, and cabbage, causing new damage problems for agriculture. Large numbers of gulls cause problems at dams, locks, reservoirs, landfills, nuclear reactors, power plants, and airports. Gull problems include eating polyurethane roofs of buildings, fouling water supplies, health hazards from feathers and fecal material, predation on domestic duck farms and fingerlings at fish hatcheries, and competition with other sea and shore bird colonies. Probably the greatest problem created by gulls is the hazard to aircraft. Currently more than one-half of all bird-aircraft strikes worldwide involve gulls.

3. Since gulls are migratory birds, they are protected by both State and Federal laws. Federal permits are required whenever gulls must be killed, but permits are not required to harass gulls. Before attempting any gull control, consult your state wildlife conservation laws.

4. A combination of playing recorded gull alarm/distress calls in conjunction with shooting shellcrackers or 15 mm whistle and noise bombs is usually effective in moving gulls from most locations. When using recorded gull alarm/distress calls, it is important to use the appropriate species-specific call, since gulls only respond to intraspecific alarm/distress calls.

5. The repellent 4-aminopyridine (Avitrol®) has been used to move gulls from locations such as airports, fish hatcheries, and landfills. It is often important to prebait an area for 4 or 5 days before treatment. Follow all directions on the label.

6. Suspended wire grids are effective in keeping gulls from landing on surfaces such as parking lots, rooftops, reservoirs, marinas, and duck farms. For short term uses, grids can be made of either binder twine or 100 lb test monofilament fish line. For more permanent situations, 0.8 mm stainless steel wire is recommended. Wire grids are usually erected in a 40 x 40 ft pattern, 4 to 10 ft above the surface. If gulls adjust to this spacing, the grid can simply be decreased to 20 x 20 ft or, if necessary, even 10 x 10 ft by simply adding more wires.

7. Killing gulls may be necessary in some situations. This is usually the case at airports where gulls create strike hazards to aircraft. Many airports employ a permanent shotgun patrol to keep gulls off runways. Both State and Federal gull depredation permits are required. The strategy is not to kill all gulls, but rather to reinforce fear in visiting flocks by occasional kills.

NATIONALLY REGISTERED BIRD CONTROL CHEMICALS*

ACTIVE INGREDIENT	TARGET SPECIES	ACTION
Strychnine	Pigeons English sparrows Magpies Horned larks Finches	Oral toxicant
3-chloro-p-toluidine HCL (DRC-1339) (Starlicide®)	Starlings Pigeons Gulls Crows Blackbirds Ravens	Oral toxicant
Endrin	English sparrows Starlings Pigeons	Contact toxicant
Fenthion	English sparrows Starlings Pigeons	Contact toxicant
Tergitol 15-S9 (PA-14)	Blackbirds Starlings Cowbirds Grackles	Lethal hypothermic stressing agent
4-Aminopyridine (AVITROL®)	Gulls Blackbirds English sparrows Starlings Cowbirds Grackles Crows	Lethal repellent
Naphthalene*	Starlings Pigeons English sparrows	Odor repellent**

*Adapted by Ed Cleary From Eschen, M. S. and E. W. Schafer. 1986. "Registered Bird Damage Control Chemicals" (Unpublished).

**The effectiveness of naphthalene as a bird repellent has recently been challenged. See Dolbeer, R. A., M. A. Link, and P. P. Woronecki. 1988. "Naphthalene shows no repellency for starlings," Wildlife Society Bulletin, Vol 16, pp 62-64.

ACTIVE INGREDIENT	TARGET SPECIES	ACTION
Polyisobutylene	birds	Tactile repellent
Polybutene	birds	Tactile repellent
Methiocarb	Blackbirds Pheasants	Taste repellent Corn seed treatment
Methiocarb (Registration questionable)	Blackbirds Starlings English sparrows Finches Jays Orioles Robins	Taste repellent Blueberries Sweet Cherries Sour Cherries Grapes
Methiocarb (Registration questionable)	birds	Taste repellent Corn Peppers
Methiocarb (registration questionable)	Cowbirds Grackles English sparrows Crows Doves	Taste repellent Nursery trees Seeds
Copper Oxalate	Crows	Taste repellent Corn seed treatment
Thiram	birds	Taste Repellent Conifer seed treatment
Lindane + Captan Powder	Pheasants	Taste repellent Seed treatment
Lindane	Pheasants	Taste repellent Seed treatment
Capsicum + Allium	Starlings English sparrows Larks Finches	Taste repellent Sprouting crops Fruits Grains Nuts

ACTIVE INGREDIENT	TARGET SPECIES	ACTION
Coal Tar + Creosote Liquid	Crows	Taste repellent Corn seed treatment
Azacosterol (Ornitrol®)	Pigeons	Reproductive inhibitor

BIRD DAMAGE CONTROL PRODUCTS AND THEIR VENDORS

Exclusion

Hardware Cloth

Valentine Equipment Co.
9706 S. Industrial Drive
Bridgeville, IL 60455
(312) 599-1101

UV-Stabilized Polypropylene Netting and Screening

Conwed®

Almac Plastics Inc.
6311 Erdman
Baltimore, MD 21205-3585
(301) 485-9100

Conwed Corporation
Plastics Division
P.O. Box 43237
St. Paul, MN 55164-0237
(612) 221-1260

Green Valley Blueberry Farm
9345 Ross Station Rd.
Sebastopol, CA 95472
(707) 887-7496

Internet Inc.
2730 Nevada Ave. N.
Minneapolis, MN 55427
(612) 541-9690

Nixalite of America
1025 16th Ave.
P.O. Box 727
East Moline, IL 61244
(309) 755-8771

Orchard Supply Co. of Sacramento
P.O. Box 956
Sacramento, CA 95804
(916) 446-7821

Teitzel's Rainier View Blueberry Farms
7720 E. 134th Avenue
Puyallup, WA 98371
(206) 863-6548

Wildlife Control Technology
6408 S. Fig St.
Fresno, CA 93706
(209) 268-1200

Toprite®

J.A. Cissel Co. Inc.
P.O. Box 339
Farmingdale, NJ 07727
(201) 938-6600

Polyvinyl Chloride (PVC) Covered Polyester Yarn Netting

Conservare Pigeon Control

ProSoCo, Inc.
P.O. Box 1578
Kansas City, KS 66117
(913) 281-2700
111 Snyder Road
South Plainfield, NJ
(201) 754-4410

1601 Rock Mountain Blvd.
Stone Mountain, GA 30083
(404) 939-9890

Traps*

Grand Rapids Audubon Club — Sp‡
54 Jefferson Ave. SE
Grand Rapids, MI 49503
Kroener Martin/Bluebird House Trap

Last Perch — Sp‡
Box 426
Mitchellville, IA 50169
(515) 967-2853

Mustang Manufacturing Co — Pi**, St***, Sp‡
P.O. Box 10947
Houston, TX 77018
(713) 682-0811

The Nature Society — Sp‡
Purple Martin Junction
Griggsville, IL 62340

*Most bird traps are "homemade."
**Pi = Pigeon.

Tomahawk Live Trap Co. Pi**, Sp‡
P.O. Box 323
Tomahawk, WI 54487
(715) 453-3550

Woodstream Corp. Pi**, Sp‡
Lititz, PA 17543
(717) 626-2125
Havahart® Victor® Tender Trap

Chemosterilants

Ornitrol®
Avitrol Corp.
320 S. Bonton Ave., Suite 514
Tulsa, OK 74103
(918) 582-3359

Wetting Agents

Contact State Animal Damage Control Agency.

Repellents

Porcupine Wire

Cat Claw®
Shaw Steeple Jacks Inc.
2710 Bedford St.
Johnstown, PA 15904
(814) 266-8008

Nixalite®
Nixalite of America
1025 16th Ave.
P.O. Box 727
East Moline, IL 61244
(309) 755-8771

Electrical Shock

Avi-Away®
Avi-Away Division
Monarch Molding Inc.
120 Liberty St.
Council Grove, KS 66846
(316) 767-5115

***St = Starling.
‡Sp = Sparrow.
**Pi = Pigeon.
‡Sp = Sparrow.

Sticky Contacts

Bird Repellent GB 1102
ArChem Corp.
1514 11th Street
P.O. Box 767
Portsmouth, OH 45662
(614) 353-1125

Bird Tanglefoot®
Forestry Suppliers, Inc.
205 W. Rankin St.
P.O. Box 8397
Jackson, MS 39204
800-647-5368
800-682-5397 (In Mississippi)

The Tanglefoot Co.
314 Straight Ave. SW
Grand Rapids, MI 49504
(616) 459-4130

Excelcide Bird Repellent
The Huge Co.
7625 Page Blvd.
St. Louis, MO 63133

Preferred Brand
Sun Pest Control
2945 McGee Trafficway
Kansas City, MO 64108
(816) 561-2174

Repel-O-Film
Baumes Castorine Co.
200 Matthew St.
P.O. Box 230
Rome, NY 13440
(315) 336-8154

Roost No More®
Velsicol Chemical Co.
341 E. Ohio St.
Chicago, IL 60611
(312) 670-4500

4-The-Birds®
J.T. Eaton & Co.
1393 Highland Rd.
Twinsburg, OH 44087
(216) 425-7801

Other Suppliers
Crown Industries
4015 Papin St.
St. Louis, MO 63110
(314) 533-0999

J.C. Ehrlich Chemical Co.
State College Laboratories
840 William Lane
Reading, PA 19612
(215) 921-0641

Hub States Corp.
419 E. Washington St.
Indianapolis, IN 46204
(317) 636-5255

Sanex Chemicals
5651 Dawson St.
Hollywood, FL 33023
(305) 961-6006

Methiocarb

Borderland Black
Borderland Products Inc.
P.O. Box 366
Buffalo, NY 14240
(716) 825-3300

Mesurol®
Mobay Chemical Co.
Chemagro Division
P.O. Box 4913
Kansas City, MO 64120
(816) 242-2000

Frightening Agents

Gas Exploders (Automatic)

Agricade Ltd.
Elm Tree House
North Fambridge
Chemsford, Essex
England, CM3 6NB
(0621-74112)

Alexander-Tagg Industries
395 Jacksonville Rd.
Warminster, PA 18974
(215) 675-7200

C. Frensch Ltd.
168 Main Street E., Box 67
Grimsby, Ontario L3M 4G1
Canada
(416) 945-3817

Hub States Corp.
1000 N. Illinois St.
Indianapolis, IN 46202

B. M. Lawrence & Co.
24 California St.
San Francisco, CA 94111
(415) 981-3650

Pisces Industries
P.O. Box 6407
Modesto, CA 95355
(209) 578-5502
Reed-Joseph International Co.
P.O. Box 894
Greenville, MS 38702
(601) 335-5822

Smith-Roles
1367 S. Anna St.
Wichita, KS 67209
(316) 945-0295; (701) 852-3726

Teiso Kasei Co. Ltd.
350 S. Figueroa St., Suite 350
Los Angeles, CA 90071
(231) 680-4349

Wildlife Control Division
Margo Supplies, LTD.
Site 8, Box 2, RR #6
Calgary, Alberta
T2M 4LS, Canada
(403) 285-9731

Pyrotechnics

Clow Seed Co.
1081 Harking Rd.
Salinas, CA 93901
(408) 422-9693
(whistlers, bird bombs)

J. E. Fricke, Co.
40 N. Front St.
Philadelphia, PA 19106
(fuse rope)

Marshall Hyde Inc.
P.O. Box 497
Port Huron, MI 48060
(313) 982-2140

Munitions Filling Factory
St. Marys, New South Wales,
Australia
(shell-crackers)

New Jersey Fireworks Co.
Box 118
Vineland, NJ 08360
(609) 692-8030
(rope firecrackers)

O.C. Ag Supply, Inc.
1328 Allec St.
Anaheim, CA 92805
(714) 991-0960

Stone Co., Inc.
P.O. Box 187
Dacono, CO 80514
(303) 893-2580

Sutton Ag Enterprises
1081 Harkins Rd.
Salinas, CA 93901
(408) 422-9693

Wald & Co.
208 Broadway
Kansas City, MO 64105
(816) 842-9299
(rope firecrackers)

Western Fireworks Co.
2542 SE 13th Avenue
Canby, OR 97013
(503) 266-7770

Wildlife Control Division
Margo Supplies Ltd.
Site 8, Box 2, RR #6
Calgary, Alberta T2M 4L5 Canada
(403) 285-9731
(bird bombs, racket bombs)

Alarm/Distress Calls (Recorded)

Applied Electronics Corp.
3003 County Line Rd.
Little Rock, AR 72201
(501) 821-3095

Schmidt, R. H., and H. L. Johnson. 1982.
Dispersal recordings, source of supply
Order from:
Department of Forestry, Fisheries and Wildlife,
202 Natural Resources Hall
University of Nebraska
Lincoln, NB 68583

Signal Broadcasting Co.
2314 Broadway St.
Denver, CO 80205
(303) 571-5649
(Sells copies of Denver Wildlife Research Center calls)

Smith's Game Calls
P.O. Box 236
Summerville, PA 15864
(starling distress call)

Wildlife Technology
P.O. Box 1061
Hollister, CA 95023
(rents recordings of alarm and distress calls)

Electronic Noises

Av-Alarm Corp.
675-D Conger St.
Eugene, OR 97402
(503) 342-1271

Bird-X
325 Huron St.
Chicago, IL 60610
(312) 648-2191

Wildlife Control Division
Margo Supplies, LTD.
Site 8, Box 2, RR# 6
Calgary, Alberta
T2M 4L5, Canada
(403) 285-9731

Other Acoustics

Falcon Safety Products Inc.
1065 Bristol Rd.
Mountainside, NJ 07092
(201) 233-5000
(air horn)

Tomko Enterprises Inc.
Route 58, RD #2
P.O. Box 937-A
Riverhead, NY 11901
(516) 727-3932
(clapper device with timer)

Lights (Flashing or Revolving)

Bird-X
325 W. Huron St.
Chicago, IL 60610
(312) 648-2191

R. E. Dietz Co.
225 Wilkinson St.
Syracuse, NY 13201
(315) 424-7400

The Huge Co.
7625 Page Blvd.
St. Louis, MO 63133
(314) 725-2555

Tripp-Lite Manufacturing Co.
500 N. Orleans
Chicago, IL 60610
(312) 329-1777

Models (Predators, Kites, and Balloons)

Atmospheric Instrumentation
Research (AIR) Inc.
1880 S. Flatiron Ct., Suite A
Boulder, CO 80301
(303) 443-7187
(polyurethane tetrahedron balloons
and kites)

Bird-X
325 W. Huron St.
Chicago, IL 60610
(312) 648-2191
(suspended hawk model)

Clow Seed Co.
1081 Harking Rd.
Salinas, CA 93901
(408) 422-9693
(hawk-kite model)

Cochranes of Oxfort Ltd.
Leafield, Oxford
England, OX8 5NT
(099387-641)
(kites)

R. M. Fay
Rt. 2 Box 2569
Grandview, WA 95930
(509) 882-3258
(balloon supported hawk-kite model)

High-as-a-Kite
200 Gate Five Rd.
Sausalito, CA 94965
(415) 332-6355
(kites)

The Huge Co., Inc.
P.O. Box 24198
St. Louis, MO 63130
(314) 725-2555
(owl model)

Raven Industries, Inc.
P.O. Box 1007
Sioux Falls, SD 57117
(605) 336-2750
(Mylar tetrahedron balloons
and blimps)

Saturn Inc.
P.O. Box 21
Kathryn, ND 58049
(701) 924-8645
(pop-up owl model with distress
call of red-winged blackbird)

Sutton Ag Enterprises
1081 Harkins Rd.
Salinas, CA 93901
(408) 422-9693
(kites)

Teiso Kasei Co. Ltd.
350 S. Figueroa St., Suite 350
Los Angeles, CA 90071
(213)680-4349
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Tiderider Inc.
P.O. Box 9
Eastern and Steele Blvds.
Baldwin, NY 11510
(516) 223-3838
(kites)

WeatherMeasure Corp.
P.O. Box 41257
Sacramento, CA 95841
(916) 481-7565
(weather balloons)

Scarecrows

W. Atlee Burpee Seed Co.
Warminster, PA 18974
(215) 674-4900
(inflatable plastic human figure)

Coleman Equipment, Inc.
332 Madison Ave.
New York, NY 10017
(212) 687-2154
(moving, noise-making scarecrow)

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Elm Tree House
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Chemsford, Essex
England CM3 6NB
(0621-741112)
(human figure)

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Tulsa, OK 74103
(918) 582-3359

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Chicago, IL 60610
(312) 648-2191

Excelcide Bird Trip
The Huge Co.
7625 Page Blvd.
St. Louis, MO 63133
(314) 725-2555

Coal Tar & Creosote (Stanley's Crow Repellent);
Copper oxalate (Crow-Chex)

Borderland Products Inc.
P.O. Box 366
Buffalo, NY 14240
(716) 825-3300

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ArChem Corp.
1514 11th Street
P.O. Box 767
Portsmouth, OH 45662
(614) 353-1125

B & G Co.
10539 Maybank St.
P.O. Box 20372
Dallas, TX 75220
(214) 357-5741

J. C. Ehrlich Chemical Co.
State College Laboratories
840 William Lane
Reading, PA 19612
(215) 921-0641

4-Aminopyridine

Avitrol Corp.
320 S. Boston Ave., Suite 514
Tulsa, OK 74103
(918) 582-3359

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325 W. Huron St.
Chicago, IL 60610
(312) 648-2191

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7625 Page Blvd.
St. Louis, MO 63133
(314) 725-2555

Starlicide®

Ralston Purina Co.
Checkerboard Square
St. Louis, MO 63164
(314) 982-1000

Toxic Perches

Rid-A-Bird Inc.
1224 Grandview Ave.
P.O. Box 22
Muscatine, IA 52761
(319) 263-7970

US DEPARTMENT OF AGRICULTURE
ANIMAL AND PLANT HEALTH INSPECTION SERVICES (APHIS)
ANIMAL DAMAGE CONTROL

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ANIMAL DAMAGE CONTROL

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SUMMARY

1. Personnel from the US Department of Agriculture, Animal and Plant Health Inspection Services (APHIS), Animal Damage Control, representing administration, wildlife managers, and researchers, presented the state-of-the-art technologies for controlling/managing the specific bird species causing damage and nuisance problems at Civil Works Projects. The species surveyed included: pigeons, starlings, house sparrows, blackbirds, Canada geese, and gulls.

2. Site-specific bird problems at Civil Works projects were further addressed between presentations and at two panel discussion sessions, and management guidelines were provided by the bird damage control experts.

3. Workshop attendees were provided with guidance for obtaining technical and operational assistance from the Federal and State agencies responsible for bird damage control. A list of vendors that specialize in bird control equipment and supplies was also provided.